STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY

DIVISION OF LAND/NOISE POLLUTION CONTROL

GROUNDWATER WITHDRAWALS FROM AQUIFERS IN ILLINOIS WITH EMPHASIS ON PWS WELLS

by
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1981

AQUIFERS OF ILLINOIS

Subsequent to consultation with the ISGS and ISWS, the IEPA identified the aquifers in Illinois. These aquifers are shown in descending order in Table B.

Table B. Aquifers of Illinois

Name of aquifers (abbreviation)		General lithology
Quaternary	(Q)	Sands and gravels**
Cretaceous-Tertiary	(K-T)	Sands and gravels**
Pennsylvanian	(Pen)	Sandstones, limestones, and coals**
Chesterian	(MCh)	Sandstones and limestones**
Valmeyeran	(MVa)	Sandstones and limestones
Silurian-Devonian	(S-D)	Dolomites and limestones
*Maquoketa	(Maq)	Dolomites and fractured shales**
Galena-Platteville	(G-P)	Dolomites and limestones
Glenwood-St. Peter	(G-StP)	Sandstones
*Prairie du Chien	(PduC)	Dolomites and sandstones
Eminence-Potosi	(E-P)	Dolomites
*Franconia	(F)	Sandy dolomites
Ironton-Galesville	(I-G)	Sandstones
Elmhurst-Mt. Simon	(E-MtS)	Sandstones

* Considered of minor importance, refer to text for details

**Rock types listed may be water yielding but generally make up less than half of the total rock thickness in the indicated units.

Properties of these aquifers are briefly described under the heading "Description of Aquifers Utilized by PWS Wells". Their detailed discussion are included in another report entitled "Aquifers of Illinois: Underground Sources of Drinking Water and Non-Drinking Water" by Student et al. (1981). Some of these aquifers are hydrologically connected and are identified as hydrostratigraphic units in parts of the State. One of the best known hydrostratigraphic units in northern Illinois is the Cambrian-Ordovician aquifer which consists of the Ironton-Galesville, Franconia, Eminence-Potosi, Prairie du Chien, Glenwood-St. Peter, and the Galena-Platteville. However, the IEPA has elected to retain individual aquifer designations due to variations in aquifer properties over a statewide basis. The wells in various use categories primarily obtain water from either the individual aquifers in Table B or any combination of them.

As indicated in Table B, three of these aquifers, the Maquoketa, Prairie du Chien, and Franconia are of "minor" importance. In the case of the Maquoketa, lithologic variations from fractured limestone, dolomite, and shales to a predominate shale group, cause a reduction of water yielding capability. Indeed, over a larger portion of Illinois, the Maquoketa is more often considered an aquitard or a confining bed rather than an aquifer. The Prairie du Chien and the Franconia are usually left open to multiple aquifer wells which penetrate to deeper sandstone aquifers. Their respective yields relative to the deeper aquifers, such the Ironton-Galesville and the Elmhurst-Mt. Simon, are of lesser quantities.

The reported well depths and yields vary from 190 to 1,640 feet, and from 33 to 2,900 gpm (Table 8). Group I PWS facilities through 36 wells withdraw 5.8 mgd of water from this aquifer (Table 14A).

Galena-Platteville: The upper part of the aquifer is known to be the most water productive. This is predominately affected by the development of crevices and solution channels within the dolomite. In areas where the Galena-Platteville is the uppermost bedrock and underlies glacial drift, crevices can be well developed and the aquifer is capable of yielding moderate quantities of ground water. Where overlain by the shales of the Maquoketa, development of crevices is less pronounced and well yields are diminished (Sasman and Baker, 1966).

The Galena-Platteville aquifer is mostly intercepted in multiple aquifer wells, 384 (Tables 13 and 15); it is also open to 12 single aquifer wells (Tables 7 and 15). The well locations are shown on Plates 5 and 13. The depth and yield of single aquifer wells range from 243 to 1,150 feet and 35 to 390 gpm, respectively. Five Group I PWS facilities with six single aquifer wells withdraw over 0.159 mgd of ground water from this aquifer (Table 14A).

Maquoketa: The Maquoketa is considered a minor aquifer, although in the large areas of the State where the lithology is predominantly shale, it is considered an aquitard. Small to moderate quantities of ground water are obtained from the dolomite beds in it. These beds are best developed in the following counties: eastern De Kalb, Kane, southern Lee, southwestern Stephenson, eastern Whiteside, and most of Jo Daviess (Sasman and Baker, 1966). There are at least 100 multiple aquifer wells and also seven single aquifer wells open to the Maquoketa aquifer (Tables 11, 13, and 15). The location of the wells is shown on Plates 6 and 13. The reported well depths and yields of single aquifer wells are from 180 to 375 feet and 25 to 400 gpm, respectively (Table 11). Two Group I public water supply facilities with four wells withdraw 0.132 mgd of ground water from this aquifer (Table 14A).

Silurian-Devonian: Ground water in this carbonate aquifer occurs in joints, solution cavities, and fissures which are irregularly distributed both vertically and horizontally. These openings are interconnected on an areal basis and can extend for considerable distances. However, the upper part of the rocks tend to be more permeable than the lower part (Csallany and Walton, 1963). The Silurian-Devonian aquifer is mostly open to single aquifer wells, 438 (Table 6), and has been intercepted in 121 multiple aquifer wells (Table 15). The location of these wells is shown on Plates 7 and 13. Over 35.5 mgd of ground water is withdrawn from this aquifer through 218 wells in 122 Group I PWS facilities (Table 14A). This is the second largest withdrawal, after the Quaternary aquifer, in Group I facilities. The reported well depths vary from 20 to 1,500 feet while well yields are between 84 and 1,193 gpm (Table 6).

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Ground H_2O withdrawals from
Aquifers in Ill with emphasis on PWS
Wells by Piskin, Student, Withers, Dickm
1981

Description of Materials

In general, most of the samples recovered were hard CLAYS and SILTS. These relatively impervious materials existed to considerable depths, usually greater than eighty (80) feet. Occasional thin lenses of SAND and SILT were encountered throughout these thick deposits of CLAY and SILT, but these lenses are generally localized and are not extensive.

In some areas, layers of SAND underlie the CLAYS and SILTS (notably B-6, B-8, B-9, and B-13), while at other locations the CLAY and SILT layers extended to the depth of auger refusal (generally 103 to 110 feet deep). The SAND layers encountered in Borings 6, 8, 9, 13 ranged between approximately eight (8) and fifteen (15) feet.

The overall depth of the borings ranged between 101 and 117 feet below ground surface.

Observation Wells

The wells consisted of four (4) inch diameter P.V.C. pipe that was provided at the site by the client. The bottom five (5) feet of each well was slotted by the client.

Wells were installed after the auger had been removed from the hole. The depth at which the bottom of the well was placed was determined by evaluating the materials encountered at each boring location. An attempt was made to set the bottom five (5) feet of the well within a significantly thick, pervious stratum of soil. In some borings, a pervious stratum of material such as SAND, GRAVEL, or even SILT, was not encountered. A summary of well depths and type of material surrounding the bottom five (5) feet of the well is provided below:

Well Number	Depth to Bottom of Well (ft.)	Soil Type
B-6	110.0	SAND/GRAVEL
B-7	97.0	CLAY
B-8	88.0	Silty SAND
B-9	97.0	CLAY SHALE
B-10	100.0	CLAY SHALE
B-11	80.0	CLAY/SILT
B-12	100.0	SILT
B-13	100.0	Silty SAND
B-14	100.0	SILT

After the well was placed at the desired depth, pea-gravel was placed around the outside of the bottom five (5) feet of the well to help prevent clogging. A bentonite-clay plug was then placed above the pea-gravel to seal the well point. The remainder of the hole surrounding the well was then backfilled with clay and another bentonite-clay plug was placed about one (1) foot below the ground surface to prevent surface water infiltration. The pipe was then cut off so that an appropriate length was exposed above ground, and a temporary cap

Table 6. Silurian-Devonian aquifer, public water supply wells (con't)

County	Pumping facility	Population (pop./yr)	Average daily pumpage of facility (gpd/yr)	No. of wells	Well location (sec.,T/R)	Well depth (feet)	Well yield (gpm)	Remarks
Cook	E.Chicago Hts.	5,000	* 1,000,000/78	5 (1)	23,35N-14E	460-499	100-1000	See table 13
	Flossmoor	8,328	* 1,100,000/77	4 (3)	2,12,35N-13E 6,35N-14E	351-505	250-600	See table 13
	Glenwood			(2)	5,9,35N-14E	222-426	110-300	See table 13
	Hanover Park (DuPage County)			(1)	36,41N-9E	202	200	See table 13 (Cook & DuPage Co.)
	Hoffman Estates	22,238	* 3,200,000/77	3	15,41N-10E	222-252	350-400	See tables 1 & 13
	Homewood	18,871	* 2,500,000/77	6 (3)	5,35N-14E 31,36,36N-14E	250-420	225-650	See table 13
	Indian Head Park	473	230,000/77	3 (1)	19,20,38N-12E	402-415	500-600	
	Lemont			(1)	29,37N-11E	241	600	See table 13
	Matteson	4,741	1,245,949/79	6	16,17,21,22, 26,35N-13E	282-450	350-1100	
	Mission Brook Sanitary Dist.(N. of Northbrook)	1,300/78	* 272,000/78	2	17,42N-12E	237-386	100-275	See table 13
	Mt. Prospect	45,228	* 4,000,000/78	3 (1)	10,11,12, 41N-11E	193-291	100	See table 13
	Olympia Fields	3,478	586,000/79	2	14,35N-13E	270-445	500-1000	
	Orland Park	6,391	* 1,833,000/77	6	2,4,9,10,17 36N-12E	397-517	200-750	See tables 10 & 13
	Park Forest	30,864	2,500,000/79	7	23,25,30,36 35N-13E	300-402	600-1500	

Table 13. Public water supply wells open to multiple aquifers (con't)

County Pumping facility	Population (pop/yr.) Average daily pumpage (gpd/yr)	Location (Sec,T/R)	No. of wells	Aquifers											Minor aquifers			Well yield(s) (gpm)	Well depth(s) (ft.)	Remarks
				Q	K-T	Pen	MCh	MVa	S-D	G-P	G-St P	E-P	I-G	E-Mt S	Maq	Pdu C	F			
Cook																				
Arlington Hts.	64,884 7,500,000/77	9,16,41N-11E;6,8,15,16,17,19,29,30,31,42N-11E	12							7	5	2	12	5		1	9	850-1800	1320-1810	
Bellwood	22,096 3,550,000/77	8,9,16,39N-12E	5						1	4	3	4	5	3		2	5	1200-1300	1460-1965	
Buffalo Grove (Lake County)	11,799 * 1,570,000/74	4,5,42N-11E	3							3	3	3	3				3	800-1000	1335-1355	See tables 7 (Cook Co.),& 13 (Lake County)
Chicago Hts.	40,900 * 7,200,000/77	8,19,35N-14E	2							2	2	2	2			2	2	1000-1250	1777-1800	See table 6
Citizen's Chicago Suburban Utility Co.(N.E.of Mt. Prospect)	25,000/78 1,700,000/78	24,26,42N-11E	4 (2) (6)							4	4		4				4	1000-1200	1320-1468	
Citizen's Fernway Subd.(S.E. of Orland Park)	3,000/77 * 200,000/77	22,36N-12E	1							1	1	1	1			1	1	700	1712	See table 6
Citizen's Waycind Pk.Subd.(S. of Mt. Prospect)	7,500/78 * 700,000/78	14,24,41N-11E	2							2	2	2	2			1	2	600-1000	1359-1382	See table 6
Des Plaines	57,239 * 8,194,859/77	13,41N-11E 18,19,41N-12E	6							6	4	6	6	4	2	4	6	300-1100	1437-1845	Surface water included
Domestic Utility Co.(S.of Glenview)	30,000/78 2,100,000/78	12,41N-12E	3							3	3	3	3			2	3	1150-1900	1402-1423	
E. Chicago Hts.	5,000 * 1,000,000/78	23,35N-14E	1							1	1	1	1	1		1		950	1858	See table 6
Elk Grove Village	20,346 * 4,900,000/78	36,41N-10E 21,26,27,32,33,35,41N-11E	10							10	10	10	10			5		600-1000	1342-1415	See table 1, see table 13 (DuPage Co.)

Table 13. Public water supply wells open to multiple aquifers (con't)

County / Pumping facility	Population (pop/yr.) / Average daily pumpage (gpd/yr)	Location (Sec,T/R)	No. of wells	Aquifers											Minor aquifers			Well yield(s) (gpm)	Well depth(s) (ft.)	Remarks
				Q	K-T	Pen	MCh	MVa	S-D	G-P	G-StP	E-F	I-G	E-MtS	Maq	PduC	F			
Cook																				
Mt. Prospect	45,228 * 4,000,000/78	10,11,23, 27,33,34, 35,41N-11E	10							7	9	9	10	9		5	9	500-1600	1310-1961	See table 6
Orland Park	6,391 * 1,833,000/77	13,36N-12E	1							1	1	1	1			1	1	900	1809	See tables 6 and 10
Palatine	26,050 * 4,098,000/77	9,14,15, 22,24,28, 42N-10E	7	1					2	3	3		5	2	1		4	250-1200	162-1960	See table 1.
Riverside	10,432 * 1,000,000/77	25,36,39N-12E	2							2	2	1	2	2		1		1200-1325	1980-2049	Approximately 5% of pumpage is surface water
Rolling Meadows	19,178 2,200,000/78	7,8,25,26, 34,36,42N-10E	7							6	6	1	7	2		1	1	500-1000	1528-1602	
Schaumburg	18,730 * 5,306,000/78	10,14,18 34,41N-10E	4						1	4	4		3			4	2	900-1400	1350-1615	See tables 1 and 6
S. Chicago Hts.		29,35N-14E	(1)						1	1	1	1	1	1		1	1	225	2756	See table 6
Streamwood	18,176 * 2,100,000/78	23,41N-9E	1							1	1		1			1	1	500	1410	See table 1
Thornton	3,714 474,000/79	34,36N-14E	2							2	2	2	2			2	2	400-600	1724-1783	
Western Springs	13,029 * 1,398,000/78	5,6,38N-12E	2							2	2		1	1			2	1000-1260	1256-1913	See table 6
Wheeling	13,243 * 1,800,000/78	3,11,23, 42N-11E	3							3	3		3				3	800-1300	1350-1370	See table 6
DeKalb																				
DeKalb	32,949 3,918,000/76	22,23,40N-4E	9							2	9	5	9		3		8	495-1331	1200-1330	
Genoa	3,210/75 428,500/77	19,42N-5E	3							3	3							500-1000	730-770	
Hinckley	1,053 115,400/77	15,38N-5E	2							2	2							300	605-708	

Table 6. Silurian-Devonian aquifer, public water supply wells (con't)

County	Pumping facility	Population (pop./yr)	Average daily pumpage of facility (gpd/yr)	No. of wells	Well location (sec.,T/R)	Well depth (feet)	Well yield (gpm)	Remarks
Cook	Prospect Meadows Subdivision (N.of Mt. Prospect)	600/78	35,050/78	1	27,42N-11E	201	175	
	Richton Park	2,558	753,000/79	2	27,33,35N-13E	418-439	500-800	
	Sauk Village	7,479	811,000/77	2	25,35N-14E	470-474	660-1000	
	Schaumberg	18,730	* 5,306,000/78	7	12,13,20,21, 24,28,32 41N-10E	206-390	250-700	See tables 1 & 13
	S. Chicago Hts.	4,923	* 789,000/78	2 (1)	29,33,35N-14E	250-493	500-700	See table 13
	Steger (Will County)	8,104	840,000/77	1	33,35N-14E	378	550	See table 6 (Will County)
	Western Springs			(2)	5,38N-12E	313-364	250-500	See table 13
	Wheeling	13,243	* 1,800,000/78	3	10,11,12 42N-11E	200-281	200-400	See table 13
Douglas	Villa Grove	2,605	207,000/76	2	10,16N-9E	627-645	250	
DuPage	Addison	24,482	* 4,500,000/77	4	19,28,33, 40N-11E	155-250	300-1000	See table 13
	Belmont-Highwood Public Water District	581/79	58,000/79	2	12,38N-10E	148-295	400-500	
	Black Hawk Hts. Subdivision (near Westmont)	1,015/77	66,700/77	1	10,38N-11E	295	200	

Under misc.

M E M O R A N D U M

DATE: February 3, 1988
TO: All Illinois FIT Personnel
FROM: Karen McTigue
SUBJECT: City of Chicago Water Information

I have come across some current updated City of Chicago water information which may assist you in completing your site inspection reports and work plans. A list of all the communities currently on water supplied from the City of Chicago is attached.

0200:3

* MR. TOREN @ Jordan Environmental Consultant
City of Chgo. Hlth dept
744-7824

COMMUNITIES SUPPLIED WATER FROM CITY OF CHICAGO

Alsip
Bedford Park
Berkeley hb-mp
Berwyn
Blue Island
Bridgeview
Broadview wb
Brookfield bn
Burnham
Burr Ridge jw
Calumet City
Calumet Park
Central Stickney S.D.
Chicago Ridge ol
Cicero
Coun. Club Hills ol
Countryside mc
Crestwood a
Des Plaines
Dixmoor h
Dolton
East Hazel Crest h
Elk Grove Vil. jawa
Elmwood Park
Evergreen Park
Flossmoor h
Forest Park
Forest View
Franklin Park
Garden Homes S.D.
Golf mg
Hanover Pk jawa (3/11)
Harvey
Harwood Heights
Hazel Crest h
Hickory Hills jw
Hillside hb-mp
Hodgkins mc
Hoffman Est. jawa
Hometown
Homewood h
Indian Head Pk. mc
Justice jw
LaGrange mc
LaGrange Hgld S.D. mc
LaGrange Park bn
Leyden Township mp
Lincolnwood
Lyons bn
Markham mn
Matteson ol
Maywood mp
McCook
Melrose Park
Merrionette Park
Midlothian mn
Morton Grove
Mount Prospect jawa
Niles
Norridge
Northlake mp-mwr
N. Riverside bn
Oak Forest ol
Oak Lawn
Oak Park
Olympia Fields ol
Orland Park ol
Palos Heights a
Palos Hills ol
Palos Park ol
Park Ridge
Phoenix h
Posen h
Riverdale
River Forest
River Grove
Riverside mc
Robbins
Rolling Meadows jawa
Rosemont
Schaumburg jawa (1/16
Schiller Park
South Holland
South Stickney S.D.
Stickney
Stone Park mp
Streamwood jawa (3/12
Summit
Thornton sh
Tinley Park ol
Westchester wb
Westhaven ol
Willow Springs jw
Worth

Some wells use?